Political markets? Politics and economics in the emergence of markets for biodiversity offsets

Ferreira, C. and Ferreira, J.

Original citation:
Ferreira, C & Ferreira, J 2018, 'Political markets? Politics and economics in the emergence of markets for biodiversity offsets' Review of Social Economy, vol. 76, no. 3, pp. 335-351

Taylor & Francis

DOI 10.1080/00346764.2018.1463445

Political markets? Politics and economics in the emergence of markets for biodiversity offsets

Carlos Ferreira[1]

Centre for Business in Society (CBiS), Coventry University

JaG 22, Jaguar Building

Coventry University

Priory Street

Coventry CV1 5FB

Email: carlos.ferreira@coventry.ac.uk

Jennifer Ferreira

Centre for Business in Society (CBiS), Coventry University

JaG 24, Jaguar Building

Coventry University

Priory Street

Coventry CV1 5FB

Email: jennifer.ferreira@coventry.ac.uk

Word count: 7323

[1] Corresponding author

Political markets? Politics and economics in the emergence of markets for biodiversity offsets

Abstract

This paper analyses the relationship between politics and performativity of economics in the emergence of markets for biodiversity offsets. While the role of economics in constructing markets has been demonstrated by sociology and social studies of science, it has also become apparent that politics plays an important role in the material outcome of economic experiments. Two case studies of the creation of markets for biodiversity offsets are analysed, in the United States and England. The findings suggest that the creation of both markets is rooted in the language, concepts and models of economics. Politics, on the other hand, functions as a mediator of the material expression of those models. Through this mediation effect, similar economic models are performed differently, resulting in a variety of markets. This suggests that the material outcomes of processes of market creation are not defined at the outset, but can be influenced by political processes.

Keywords: markets; biodiversity offsets; calculation; performativity of economics; politics

1. On markets, economics and politics

Despite the growing importance of markets in the functioning of neoliberal economies, the origin of these forms of exchange remains under-conceptualised. Economics describes markets as naturally-existing phenomena, which emerge whenever the necessary conditions are fulfilled (Rosenbaum, 2000). This perspective is unsatisfactory, as it fails to provide a comprehensive explanation of the processes by which markets are constructed. An alternative approach was first suggested in Michel Callon's book *The Laws of the Markets* (1998b), which specified a different epistemic relationship between economic theory and the materiality of markets: That economics contributes to the construction and configuration of economic life, rather than simply describing it. Economic sciences provide the practices which define rules, agents and models to format markets (Callon, 1998a, 2007; Garcia-Perpet, 2007; MacKenzie, 2007). However, while this thesis of the performativity of economics is now generally ~~acceptance~~accepted, its limitations have also become apparent. On the one hand, the performativity thesis has struggled to account for the material diversity of markets observed in practice (Svetlova, 2012). On the other hand, by focusing on the technical aspects of the construction of markets, it may fail to pay the necessary attention to the politics of market creation (Breslau, 2013; Miller, 2002).

Economics is often performed through economic experiments (Muniesa and Callon, 2007). A particular type of economic experiment provides an intersection between economic sciences and policymaking: *In-vivo* experiments, which make use of society as the experimental setting. In these cases, social or environmental problems are framed as instances of market failure (cf. Stern, 2007; TEEB, 2008), caused by the proliferation of externalities – economic costs (or benefits) affecting agents which did not choose to incur said effects. Economics suggests that addressing these issues

requires internalising the underlying externality, which can be done by creating a market for it. Much of the experimental work in creating material markets involves designing and specifying the properties of the economic objects to be exchanged, by framing externalities and making them calculable. This framing is achieved by calculative agencies, composed of humans and technological devices, whose operations make goods calculable (Callon and Muniesa, 2005; Muniesa et al., 2007; Preda, 2006). Through the operation of these calculative agencies, which make use of technical and scientific knowledge from economics and other sciences, markets become the product of socio-technical practice, (Mitchell, 2008). Economics underpins the construction and operation of the socio-technical infrastructure upon which the material market is built. Overall, the performativity thesis points to a plausible generative mechanism for markets.

However, as Callon himself notes, economics is necessary but not sufficient to create markets (Callon, 2007). One of the issues the performativity theory struggles to accommodate is the observable variety of markets. Markets for the same commodity can be materially different, be it in terms of their socio-technical infrastructures, of the prevalent 'rules of the game', or their outcomes (Boyer, 1997). Researchers applying the performativity framework have often noted how the politics of market formation can colour their results. In MacKenzie's study of the development of the European Union's Emissions Trading Scheme for CO2 emissions (2009), it is shown that the exercise of price discovery in the market is impacted by the politics of allocation of emission permits amongst polluters. Similarly, Breslau (2013) has shown that the price of electricity in US capacity markets is, at any point, as much a product of supply and demand as of political considerations. In this sense, the performativity of economics is mediated by politics (Breslau, 2013; MacKenzie, 2009): Economics sets the space

where experimentation takes place, but the material details of individual economic experiments are determined by the interplay of political actors within that space.

However, the ‘mediation’ model is not the only interpretation of the relationship between performativity of economics and the politics of market creation. An alternative model, described as ‘marketization’, describes the entanglement of state (political) and market actors with the objective of inserting markets into the provision of public goods, as part of a neoliberal political project (Birch and Siemiatycki, 2015; Castree, 2008). Proponents of this model have sought to integrate the performativity thesis within a broader political economy approach (Christophers, 2014a). This strand of research sees the idea of the market as a discursive construct, mostly tasked with performing problematic political work Biodiversity Offsets Pilot (England). In their study of the creation of Individual Trading Quotas (ITQs) for fisheries in Norway, Holm and Nielsen (2007) suggest that the market is performed as a political device, shifting political resources in the fishing industry itself. Similarly, Christophers (2014b) has suggested that specific economic models are performed by transnational corporations as discourses, in order to secure higher profits. Associated with this idea has been a critique of the performativity thesis as an exercise in relativism, which seeks to abstract market creation from politics and culture (Butler, 2010; Miller, 2002). The ‘marketization’ model sees the performativity of economics as a tool deployed with political objectives.

The two models (‘mediation’ and ‘marketisation’) describe the relationship between performativity of economics and political projects in the construction of markets differently. The ‘mediator’ model suggests that economic ideas and models are refracted through the prism of mediating political projects and turned into calculative devices and socio-technical practices. In this case, it would be expected that markets

for the same good would apply similar economic models, subject to differing political projects. The result would be a variety of market outcomes. Conversely, the 'marketization' model suggests that the political projects of neoliberalisation and assisting capital accumulation are the drivers of the creation of markets. Economics would be performed to assist these objectives, used as a discursive device. The result would be relatively similar outcomes in different cases, given that the design and operation of the market is secondary to its role as a tool for capital accumulation. This paper compares how each of the two models fits with observable reality. This is done by analysing the creation of two markets for biodiversity offsets, in the United States and in England, and observing the role played by economic ideas and models, as well as the prevailing political projects in each case. More specifically, the paper identifies the genesis of the market in each case, and how economics and politics interact.

The article is organised as follows: Section 2 introduces the concept of biodiversity offsetting, as well as the two case studies selected for analysis. Section 3 analyses each of the markets in turn. The article concludes by showing how economic concepts frame the political action in the creation of markets. The observed variety of market outcomes suggests that the 'mediator' model is a better description of the relationship between performativity of economics and politics.

2. Markets for biodiversity offsets: Political contexts and economic experiments

Empirically, this paper analyses and compares two case studies of the emergence of two for biodiversity offsets: Species Banking in the United States, and Biodiversity Offsets pilots in England. Biodiversity offsets are defined as '...conservation actions

intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects, so as to ensure *no net loss of biodiversity*' (ten Kate et al., 2004: 13). In biodiversity offset markets, developers can acquire certified offsets from third parties (such as landowners and specialised 'biodiversity banks') in a regulated marketplace. This allows developers to discharge their legal obligation to compensate for the negative impacts of their projects over biodiversity. In other words, these markets exist due to planning regulation requiring developers to compensate for their impact over nature (Ecosystem Marketplace, 2017). This creates a special analytical situation: The exchange between buyers and sellers takes place because of a legal requirement. Biodiversity offsets do not hold direct economic value for the developers buying them: As one of the interviewees for the study remarked, '…a gun to the head is the only reason why people buy these credits [*offsets*]. Other than that, nobody is going to be buying' (Interviewee H).

Absence of demand apart, these programmes share a number of the characteristics which would be expected in markets: There are suppliers of offsets selling biodiversity conservation (sellers), buyers of biodiversity offsets (developers) and regulatory frameworks (Madsen et al., 2010). Buyers acquire offsets and sellers compete for custom, often on the basis of cost (Bayon et al., 2008; Denisoff, 2008). Furthermore, a number of techniques and mechanisms for measuring and quantifying biodiversity losses must be developed and employed (Madsen et al., 2010, 2011).

The markets were chosen to represent a mature market (US Species Banking, which has been in operation since circa 1992) and a nascent market (UK Biodiversity Offsets Pilots, which ran between 2012 and 2014). Secondary data from policy and consultancy documents relevant for each case was first collected and analysed. This was followed up by 24 semi-structured interviews with appropriate stakeholders. Some

of these informants were involved in only one of the case studies, while others had worked in both. All interviews took place between 2012 and 2014, during which both markets were simultaneously in operation. Table 1 lists the participants, the case they are involved in, and their role in the market.

== TABLE 1 HERE ==

Participants included policymakers, biodiversity offsetting promoters, offset providers, consultants, NGOs, corporate environmental and reputation managers and market intermediaries. These groups were selected for their potential roles in creating and shaping the markets in each case. Efforts were made to interview comparable stakeholders in each case, in order to promote comparability of findings, although sometimes this was not possible due to the difficulties of access involved in interviewing elite individuals (Desmond, 2004; Goldstein, 2002). These limitations were addressed in two ways: First, by interviewing individuals with transnational experience of biodiversity offsetting, and which have been involved in more than one of these markets. Second, by triangulating interview data with secondary data from policy and technical reports, as well as market information from the Species Baking website (Ecosystem Marketplace, 2017)

3. Markets for nature: Biodiversity offsets as economic experiments

The case studies presented share a common aim: To promote markets for biodiversity offsets in order to ensure that development results in *no net loss of biodiversity* (BBOP,

2012; eftec and IEEP, 2010; Treweek et al., 2009). The strict definition of biodiversity offsetting in terms of *no net loss* creates a direct, measurable link between losses and compensation, establishing equivalence between two alternative land uses. The language is directly derived from economics, and suggests that biodiversity can be seen as fungible: Biodiversity losses taking place in one location could, in principle, be efficiently exchanged by biodiversity gains in another location.

The concept of *no net loss of biodiversity* serves as an engine for the development of markets for biodiversity offsets: It is a driver of the performativity of economics, which establishes a baseline for the material functioning of the market, pointing to the need to develop a socio-technical infrastructure to deliver it. At the same time, it is also a political construct, which expresses a normative value through language. Economy and politics constitute a powerful nexus in the process of creating and shaping biodiversity offset markets: Economics provides a political language, which configures the material working of market devices, processes and practices (Cochoy et al., 2010). However, this in itself does not specify the relationship between economics and politics in the context of performativity. This is analysed in the cases below.

3.1 US Species Banking

3.1.1. Performing economics

The development of a biodiversity offsetting scheme in the United States derives from previous regulation requiring that any losses of endangered species must be compensated. The Endangered Species Act of 1973 specified that listed species were warranted legal protection, and that their continued survival should take precedence over economic gains from land development. This precedence extended up to denial

of planning permission. After the Act began to be implemented, local regulators and developers began to find that the balance between conservation of biodiversity and economic development had shifted excessively in favour of conservation. This was noted by Interviewee H, a long-time biodiversity offsets banker in the United States and former regulator:

> …as regulators for overseeing endangered species habitats we were stopping bad projects, but we could only stop them. If there were good projects that needed to move forward there wasn't much we could do *[Interviewee H]*

By only being able to stop land development proposals with extensive negative impacts over biodiversity ('bad projects'), the regulators found they were harming developers and, ultimately, economic growth as well. ~~The problem~~Moreover, the lack of policy mechanisms to balance the needs of conservation and development did not affect developers alone~~.~~ : The restrictions to development imposed by the ESA ~~were having~~also had unintended negative consequences for the species they were supposed to protect ~~as well~~. The ~~existence~~ presence of an endangered species could ~~severely impact~~result in the loss of ~~the~~ potential economic value of an area, due to the associated development restrictions. As a result, when confronted with the discovery of an endangered species in their land, landowners and developers had all the incentive to eradicate that species, and often did so (Bayon et al., 2008).

These pressures resulted in the development of a set of mechanisms that sought to allow development to take place, while simultaneously requiring developers to demonstrate that stocks of endangered species would not be affected. These experiments resulted in the emergence of a number of competing forms of

mechanisms to compensate for biodiversity losses: One-off compensation, where offsetting measures are agreed on a case-by-case basis; *in-lieu* fees, a situation in which developers offset biodiversity losses via a monetary payment; and Species Banking, an approach which saw the creation of 'entrepreneurial credit banks', from which developers can acquire pre-certified biodiversity offsets.

One-off offsets and the payment of *in-lieu* fees provided the backbone of US mitigation and offsetting policy in the 1970s and 1980s (Mead, 2008). Neither can be considered a market for biodiversity offsets. One-off offsets are usually delivered by developers themselves, which means there is no exchange: There is no seller, and no goods are acquired. In the case of *in-lieu* fees, they involve a direct payment to a third party, such as a public agency or a non-governmental organisation, which pools such contributions in order to maintain a site. They also tend to occur after the impact takes place (Berahzer, 2015).

Starting in the mid-1990s, Species Banking was created with the intention of operating according to the principles of economics. First, the programme is based on the possibility of economic exchange:

> *…conservation banking is a* free market enterprise *that allows for the* sale, purchase or trade of habitat or species*, represented by a currency referred to as credits.* (Mead, 2008: 16, emphasis added)

Second, the market is a mechanism to allow landowners to capitalise on the non-market goods which their land produces:

> *As in any market, there must be both supply and demand for such a system to work.* Conservation banking credits are the economic

> reward supplied by the resource agencies to the landowner*, who agrees to preserve, protect and manage habitat in perpetuity.* (Mead, 2008: 17, emphasis added)

And third, there is an implicit model of a demand curve, formed by grouping buyers' willingness to pay for compensation:

> Market prices are based on how much buyers will pay. *Since conservation banking in voluntary, there is a built-in cap in prices – buyers are unlikely to pay more than what it would cost them to supply the required mitigation on their own*. (Mead, 2008: 17, emphasis added)

The experience with the Species Banking programme shows the importance of economics in framing how conservation takes place. It consists of a mechanism for addressing biodiversity losses which makes use of the language and models of economic sciences. However, the implementation of these principles in practice reveals the important role played by politics in shaping the resulting market.

3.1.2. Political challenges

The operation of the biodiversity offsets market in the Species Banking programme involves trading in commodities designated 'biodiversity credits'. When a development project results in losses to an endangered species, planning approval is contingent to the developer presenting evidence of appropriate compensation, by acquiring the appropriate number of credits from a species bank (Gardner, 2008; Mead, 2008). To determine what constitutes appropriate compensation involves estimating the stocks

of endangered species in a given area, a process fraught with difficulties (Robertson, 2006, 2007). In order to avoid the complexity and uncertainties involved in producing these estimates, practitioners in the Species Banking programme usually calculate equivalence between losses and offset based on a proxy currency – habitat-area size (Bonnie and Wilcove, 2008; Fox and Nino-Murcia, 2005). In this commonly used form of measurement, biodiversity losses are quantified as the number of acres of habitat of a given species lost to a development project. This loss is offset when the developer acquires the same number of acres of the same habitat from a species bank. The use of area as a proxy for biodiversity credits has the advantage of simplicity and reducing the need for complex measurements and calculations.

However, this simple measure of equivalence has become increasingly contested. Alternative methods for calculating in use include 'habitat quality, habitat quantity, species covered, conservation benefits, including contribution to regional conservation efforts, property location and configuration, and available or prospective resource values' (USFWS, 2003: 9). As the complexity of calculation increases and new variables need to be taken into account, both cost and measurement errors increase. But despite these drawbacks, the mitigation banking industry has consistently called for more complex measurement and quantification, and lobbied for stronger standards to be applied to all offsetting activities. This is a concerted attempt to counter competition from non-market forms of compensation, as described by Interviewee D, a consultant:

> *…the bankers were building these wetland banks and putting in place all these incredible structures – you know, financing structures, insurance structures, management endowments – this incredible amount of work. These are pretty amazing little self-funded protected*

> *reserves. It cost them a lot, and the other ways that the regulator would allow a company to offset – like paying for an in-lieu fee fund, or doing their own offset – were not nearly as rigorous as the banks' credits. And so, the bankers were saying 'you require all of this from us, why don't you require it from the others!', because it makes the playing field uneven, it makes us have to charge more for our credits.* [Interviewee D]

In their political lobbying for higher complexity, the mitigation banking industry uses the language of economics, describing the creation of more stringent standards as a mechanism for creating a 'level playing field'. Another typical comment was made by interviewee H, a mitigation banker and former regulator:

> *One of the things that the regulation did was try to create a more level playing field for the types of mitigation that's being created as a permanent responsibility or banking.* [Interviewee H]

The 'level playing field' aspect is a clear reference to economics, an invocation of the equal opportunities for competitors in the marketplace advocated by economists as a mechanism to deliver maximum social welfare. The 'level playing field' in question is, by default, the market itself. In invoking it, the species banking industry is using the language of economics to promote their offer over the non-market competition. This is not targeted at buyers in the market (who have no preference for the origin of their offsets) but to regulators. The industry is lobbying for their product by noting that the existence of other, less-regulated, forms of compensation acts as externalities in their market. This description of th~~e~~is issue as an externality is ~~patent~~ apparent in the opinions of Interviewee I, an offsets provider:

> *What ends up happening is the resource agencies will allow leakage in the market because of the pressure of high cost credits, allow these lesser alternatives to take place, when in fact the credit has financial assurances, long-term stewardship, all the bells and whistles: Credit release schedule, success criteria, easements in place. But the credits are more expensive because of that. If the agencies don't support the preference* [for market over non-market provision of biodiversity offsets]*, it's very easy to undercut the pricing, and that pressure is always in our market.* [Interviewee I]

The comments illustrate the general strategy of the mitigation banking industry in the competition for primacy in the provision of compensation: To use the fact that regulators require strong standards from Species Banking operators to require that non-market competitors are subject to the same requirements. In the background to this is a similar campaign undertaken by many of the same actors in the context of the wetlands mitigation banking programme, from which Species Banking descends (Gardner, 2011). In that instance, the wetlands mitigation industry was successful in obtaining a ruling from the federal regulator (the Environmental Protection Agency), which gave primacy to the market mechanism over non-market competitors (EPA, 2008; Hough and Robertson, 2008). However, there is evidence that implementation of this ruling remains patchy (Kett, 2010; Madsen, 2013).

Performing economics has not, so far, been able to completely turn politics to the market promoters' advantage. The non-market forms of compensation remain in operation, and account for a significantly larger proportion of offsetting ~~that~~ than Species Banking does (Dempsey and Suarez, 2016). The market form of biodiversity

offsetting in the United States is not hegemonic, and does not appear to be the result of a deliberate political project.

The origins of the Species Banking market can be found in economic sciences. Despite the existence of other forms of compensation for biodiversity losses, a market was created to perform economics. However, the political environment has been challenging to the market, not only by limiting the scope of what can be offset (endangered species), but also by allowing non-market forms of compensation to take place. The material expression of the Species Banking market (offsetting for endangered species only, expensive and uncompetitive conservation banks, limited size) is the result of performativity of economics, mediated by politics.

3.2. UK Biodiversity Offsets pilot programme

3.2.1. Performing economics

The Biodiversity Offsets pilot program operated in England between July 2012 and the end of 2014. Compensation for biodiversity losses is covered by Section 106 of the Town and Country Planning Act 1990, through which developers and local authorities can negotiate compensation agreements. However, the results of these case-by-case arrangements have been criticized for their inability to deliver appropriate levels of conservation (Latimer and Hill, 2007). These critiques focused around the apparent market failure in the existing planning regime in England: As a non-market good, biodiversity is under-valued, under-sold and over-exploited (Ferreira, 2017). These criticisms were repeated in a number of policy papers, which suggested biodiversity offsets as an alternative approach (DEFRA, 2010; Lawton et al., 2010; Treweek et al., 2009).

In the aftermath of the 2010 UK General Election biodiversity offsetting gained political traction, as the Conservative Party, now in government, had pledged to pilot offsetting in its electoral manifesto. In 2012 the Department for Environment, Food & Rural Affairs (DEFRA) announced that 6 pilot biodiversity offset projects would be commissioned to test the approach (DEFRA, 2012). Explaining the advantages of biodiversity offsets against other forms of compensation for biodiversity losses, a bureaucrat at DEFRA set out the advantages of the market approach versus existing forms of compensation:

> *It* [mechanisms for offsetting] *is a spectrum. Habitat banking is obviously much more linked to that trading in credits, and setting up a bank in advance of the actual development and offset, or credit for it... and at the other end of the spectrum you've got the developers doing their own offsetting projects.* (…) *I do lean towards the more market-end spectrum, partly because that potential to develop the project* ex-ante, *and that building-up of supply-side facilitates that whole proper offsetting and delivering of* no net loss of biodiversity*. I see that as the option that would fulfil the* no net loss of biodiversity*.* [Interviewee K]

For this respondent, the market is being compared and contrasted with non-market mechanisms for procuring compensation for biodiversity losses, and found to be a better solution. In particular, the market is identified as the single mechanism which would deliver the hoped-for no net loss of biodiversity. The normative preference for no net loss of biodiversity means applying the language, tools and procedures of economics to the problem of biodiversity loss.

However, it soon became apparent that the programme was also part of a political project to reform the UK's planning regime. This was made clear by the Secretary of State for Environment, Food and Rural Affairs, who in his introduction of the program to Parliament stated that:

> *Some planning decisions take too long and the outcome can be too uncertain, which can hinder development. At the same time biodiversity impacts are not always adequately taken into account, or mitigated or compensated for in ways that deliver enduring environmental benefit. Biodiversity offsetting has the potential to help the planning system deliver more for the environment and the economy. (Paterson, 2013)*

In this interpretation, biodiversity offsets were also being promoted as a mechanism to help overcome environmental restrictions to development. The same point was made by the DEFRA-sponsored Ecosystem Markets Task Force (EMTF), which elected biodiversity offsets as the ecosystems market most likely to deliver economic growth for the UK (EMTF, 2013). Together, these two positions suggest that, apart from promoting conservation, biodiversity offsetting was doing a significant amount of political work, serving as a mechanism to reform a contentious regime of governance. However, the political project was framed by the need to perform the models and precepts of economic sciences: The attempt to reform planning had to conform to the 'the laws of the markets'. The power of the economic framing over the political objectives became especially clear in the choice made by the regulator with regards to what commodity was to be exchanged.

3.2.2. Political challenges

The political desire to ensure that biodiversity offsets would play a significant role in the planning process had an impact on the commodity chosen. Rather than covering only specific aspects of nature – such as endangered species, as in the Species Banking case – the pilots were designed to provide compensation for habitat losses (DEFRA, 2011a). This meant that the program needed to cover a broader range of situations, and thus be reproducible in different locations and ecological contexts (Ferreira, 2017). DEFRA suggested that 'habitat types' and their 'level of protection' were the important dimensions of biodiversity which must be accounted for in demonstrating *no net loss of biodiversity* (DEFRA, 2011a). This relatively imprecise definition of what exactly should be included in calculation was a consistent feature of most policy papers throughout development of offsetting in England (see, for example, DEFRA, 2010, 2011b; Lawton et al., 2010). These difficulties became embedded in the calculative device proposed by DEFRA to underpin the market: The biodiversity 'metric':

> *Biodiversity in its entirety is impossible to measure so a 'metric' is used to represent, and provide a measure of, overall biodiversity. Metrics are surrogates, or combinations of measurements, that together provide an assessment of the biodiversity value of a particular area. The metric allows the biodiversity impact of a development to be quantified so that the offset requirement, and the value of the compensatory action, can be clearly defined. Metrics are transferable between sites and habitats, allowing an impact on one habitat type to be offset with conservation action elsewhere, or involving a different habitat type and/or quality of habitat.* (DEFRA, 2011a: 2)

DEFRA's biodiversity metric worked by attempting to reduce the multivariate aspects of biodiversity to single indicator. Through the action of the commodification technologies, the meaning of biodiversity as a localised set of goods, services and values is changed: The metric normalised and established a language of "credits" and "debts" which is at the root of the concept of no net loss of biodiversity. It economised biodiversity.

However, biodiversity is a complex construct, ranging from the micro-cellular to the ecosystem level, often complemented by socio-cultural aspects attached to it by individuals or groups. This makes biodiversity an 'uncooperative commodity' (Bakker, 2003, 2005), a good which presents difficulties to calculative agencies. In addition, there is a paucity of reliable tools to calculate the value of a habitat, as required by the DEFRA stipulations. This created a series of problems in terms of developing a reliable commodity.

The question of how to measure biodiversity concerns not only the work of calculative agencies, but the functioning of a market for biodiversity offsets. There is a fundamental tension between improving market operation and more complex measurement, as noted by an ecological consultant who has worked on environmental restauration for a number of years:

> *…if you have a very broad definition of the different components of biodiversity that are required to be offset, then you will be able to generate the flexible, and sort of deeper market. [Interviewee E]*

Put another way, the development of ever more precise technical devices for the commodification of biodiversity, which can identify ever finer distinctions between two areas, may paradoxically result in greater restrictions to the comparability and

exchangeability of development and offset area (Quétier, 2012; Robertson, 2004). However, this comparability and exchangeability – the possibility that agents can evaluate the trade-offs between two distinct states of the world and choose between them – is at the core of the existence of a market. It is also implicit in the definition of no net loss of biodiversity, which establishes the requirement that biodiversity lost in one place is thoroughly compensated by biodiversity gained elsewhere.

In the event, the biodiversity offset pilots were completed and finished operating in 2014. Offsetting still takes place, but only on a case-by-case basis. No nationwide market for biodiversity offsetting has been established in England. The final report to DEFRA suggests that there was considerable interest in the concept of offsetting, but that developers were not interested in incurring the extra costs involved in acquiring biodiversity offsets (Collingwood Environmental Planning and IEEP, 2014). Developers would certainly agree with the political project to streamline and simplify planning; however, the regulator's appetite for a market for biodiversity offsetting, rather than reforming planning laws, was not widely shared. Economics was used to frame the debate about the relationship between conservation and development, and restricted the mechanisms by which the issues could be addressed. The focus of the activity rested on developing a calculative infrastructure and constructing a market; The political project served as a mediator, defining what constituted a valid commodity, and setting market actors up for developing a complex, and eventually unsuccessful, calculative device – the metric.

4. Discussion and conclusions: Politics mediating economics

This article has discussed the interplay of politics and economics in the construction of markets, using as case studies the emergence of markets for biodiversity offsets in the United States (Species Banking) and in England (Biodiversity Offsets Pilots). Politics and economics are both involved in the emergence of these markets, but the relationship between them is complex. In both cases, economic models and ideas are at the genesis of the market. However, to accept that politics and economics are both performative and that they combine in the process of market creation is not the same as accepting the 'marketisation' hypotheses of market creation. Economic models and ideas are not used only for the purposes of undertaking the difficult political work of circumscribing or weakening regulations which put conservation ahead of development. If this was the case, the actors interested in promoting a hegemonic neoliberal model of conservation would likely avoid any aspects of the market approach which did not suit their political project. In fact, the opposite can be observed: The normative aspects of economics, which prescribe that markets must conform to the economic model, are potent drivers for action.

In both case studies, market actors have attempted to promote compensation via a market for biodiversity offsets as a genuine alternative to non-market forms of compensation. The evidence for this comes from the insistence, in both cases, that all compensation activity should obey higher standards than what is on offer on non-market arrangements. The commitment to this is so strong that it has, in effect, condemned the markets to either remain small (in the United States) or to disappear altogether (in England).

The specific political projects and challenges in each programme play out within the strictly-defined space of economic models. Politics does not create the market, but it

affects how it operates. This means that the outcomes observed – in terms of market structure and functioning – are the result of mediation: A market for endangered species is necessarily different from a market designed to compensate for losses to all types of habitats, particularly in terms of the calculative agencies which make nature calculable. But despite these differences, the two markets are clearly products of the same set of ideas and models. Both were constructed by performing economic models and ideas, and this performation was mediated by individual political projects. The markets are the result of economics being performed, and politics mediates the process. The result is materially different markets.

Politics and economics cannot be understood as separate aspects of the process constructing the economy. As noted above, the engines of performativity can be discursive and language-based. As an example, no net loss of biodiversity is not a recognisable neoclassical economic model; instead, it is a construct which brings together ethical and normative considerations, which give it a political dimension. This is not surprising: It has been recognised that the performativity of economics involves a political dimension (Cochoy et al., 2010), and that politics and the economy are co-produced in the same performation process (Callon, 2010). It also means that economics is not and anti-politics machine, employed to reduce legitimate political debate, as appears to be suggested by the ‘marketisation’ thesis. Rather, it means that the materials outcomes of the market are not defined at the outset. This opens opportunities for political actors to oppose the domination of neoliberal doctrines, promoting their preferred outcomes through mediation of the process of market creation.

References

Bakker K (2003) *An Uncooperative Commodity: Privatising Water in England and Wales*. Oxford: Oxford University Press.

Bakker K (2005) Neoliberalizing nature? market environmentalism in water supply in England and Wales. *Annals of the Association of American Geographers* 95(3): 542–565.

Bayon R, Carroll N and Fox J (2008) Introduction. In: Carroll N, Fox J, and Bayon R (eds), *Conservation & Biodiversity Banking, A Guide to Setting Up and Running Biodiversity Credit Trading Systems*, London: Earthscan, pp. 4–8.

BBOP (2012) *Standard on Biodiversity Offsets*. Washington D.C.: Business and Biodiversity Offset Programme.

Berahzer S (2015) Sustainable In-Lieu Fee Programs for Wetland Mitigation. *Environmental Finance Blog*. Available from: http://efc.web.unc.edu/2015/09/22/in-lieu-fee-wetlands/ (accessed 8 September 2017).

Birch K and Siemiatycki M (2015) Neoliberalism and the geographies of marketization: The entangling of state and markets. *Progress in Human Geography* 40(2): 177–198.

Bonnie R and Wilcove D (2008) Ecological considerations. In: Carroll N, Fox J, and Bayon R (eds), *Conservation & Biodiversity Banking, A Guide to Setting Up and Running Biodiversity Credit Trading Systems*, London: Earthscan, pp. 53–68.

Boyer R (1997) The variety and unequal performance of really existing markets: farewell to Doctor Pangloss? In: Hollingsworth JR and Boyer R (eds), *Contemporary Capitalism: The Embeddedness of Institutions*, Cambridge: Cambridge University Press, pp. 55–93.

Breslau D (2013) Designing a market-like entity: Economics in the politics of market formation. *Social Studies of Science* 43(6): 829–851.

Butler J (2010) PERFORMATIVE AGENCY. *Journal of Cultural Economy* 3(2): 147–161.

Callon M (1998a) Introduction: the embeddedness of economic markets in economics. In: Callon M (ed.), *The Laws of the Markets*, Oxford: Blackwell Publishers, pp. 1–57.

Callon M (1998b) *The Laws of the Markets*. Oxford: Blackwell Publishers.

Callon M (2007) What does it mean to say that economics is performative? In: MacKenzie D, Muniesa F, and Siu L (eds), *Do Economists Make Markets? On the Performativity of Economics*, Oxford: Princeton University Press, pp. 311–357.

Callon M (2010) PERFORMATIVITY, MISFIRES AND POLITICS. *Journal of Cultural Economy* 3(2): 163–169.

Callon M and Muniesa F (2005) Economic markets as calculative collective devices. *Organization Studies* 26(8): 1229–1250.

Castree N (2008) Neoliberalising nature: the logics of deregulation and reregulation. *Environment and Planning A* 40(1): 131–152.

Christophers B (2014a) From Marx to market and back again: Performing the economy. *Geoforum* 57: 12–20.

Christophers B (2014b) On the Performativity of Pill Pricing: Theory and Reality in the Economics of Global Pharmaceuticalization: Pill Pricing and Performativity. *Antipode*: 1054–1071.

Cochoy F, Giraudeau M and McFall L (2010) PERFORMATIVITY, ECONOMICS AND POLITICS: An overview. *Journal of Cultural Economy* 3(2): 139–146.

Collingwood Environmental Planning and IEEP (2014) *Evaluation of the Biodiversity Offsetting Pilot Programme. Final Report Volume 1*. London: Collingwood Environmental Planning; The Institute for European Environmental Policy. Available from: http://randd.defra.gov.uk/Document.aspx?Document=11689_WC1051-SummaryEvaluationoftheBiodiversityOffsettingPilotInterimReport.doc.

DEFRA (2010) *An invitation to shape the Nature of England - Discussion Document*. London: Department for Environment, Food and Rural Affairs.

DEFRA (2011a) *Biodiversity offsetting. Guiding principles for biodiversity offsetting*. London: DEFRA. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/218681/110714offsetting-guiding-principles.pdf.

DEFRA (2011b) *Mainstreaming sustainable development – the Government's vision and what this means in practice*. London: DEFRA.

DEFRA (2012) Piloting biodiversity offsetting. Available from: http://www.defra.gov.uk/environment/natural/biodiversity/uk/offsetting/pilots/ (accessed 25 April 2012).

Dempsey J and Suarez DC (2016) Arrested Development? The Promises and Paradoxes of 'Selling Nature to Save It'. *Annals of the American Association of Geographers* 106(3): 653–671.

Denisoff C (2008) Business Considerations. In: Carroll N, Fox J, and Bayon (eds), *Conservation & biodiversity banking, a guide to setting up and running biodiversity credit trading systems*, London: Earthscan, pp. 109–126.

Desmond M (2004) Methodological challenges posed by studying an elite in the field. *Area* 36(3): 262–269.

Ecosystem Marketplace (2017) Global Species Banking - Programs. Available from: http://global.speciesbanking.com/global.php (accessed 15 April 2015).

eftec and IEEP (2010) *The use of market-based instruments for biodiversity protection – the case of habitat banking*. London: eftec.

EMTF (2013) *Realising nature's value: The Final Report of the Ecosystem Markets Task Force*. London: EMTF-DEFRA.

EPA (2008) Compensatory Mitigation for Losses of Aquatic Resources; Final Rule. Available from: http://water.epa.gov/lawsregs/guidance/wetlands/upload/2008_04_10_wetlands_wetlands_mitigation_final_rule_4_10_08.pdf.

Ferreira C (2017) The contested instruments of a new governance regime: accounting for nature and building markets for biodiversity offsets. *Accounting, Auditing & Accountability Journal* 30(7): 1568–1590.

Fox J and Nino-Murcia A (2005) Status of Species Conservation Banking in the United States. *Conservation Biology* 19(4): 996–1007.

Garcia-Perpet M-F (2007) The social construction of a perfect market: the strawberry auction at Fontaines-en-Sologne. In: MacKenzie D, Muniesa F, and Siu L (eds), *Do Economists Make Markets? On the Performativity of Economics*, Oxford: Princeton University Press, pp. 20–53.

Gardner RC (2008) Legal Considerations. In: Carroll N, Fox J, and Bayon R (eds), *Conservation & Biodiversity Banking, A Guide to Setting Up and Running Biodiversity Credit Trading Systems*, London: Earthscan, pp. 69–88.

Gardner RC (2011) *Lawyers, Swamps, and Money. US Wetland Law, Policy, and Politics*. Washington D.C.: Island Press.

Goldstein K (2002) Getting in the Door: Sampling and Completing Elite Interviews. *Political Science & Politics* 35(04): 669–672.

Holm P and Nielsen KN (2007) Framing fish, making markets: the construction of Individual Trading Quotas (ITQs). In: Callon M, Millo Y, and Muniesa F (eds), *Market Devices*, Malden, MA: Blackwell Publishing, pp. 173–195.

Hough P and Robertson M (2008) Mitigation under Section 404 of the Clean Water Act: where it comes from, what it means. *Wetlands Ecology and Management* 17(1): 15–33.

Kett H (2010) Mitigation Bankers Say Army Corps Not Following the Rule. Available from: http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=7727&section=home (accessed 22 April 2011).

Latimer W and Hill D (2007) Mitigation banking: securing no net loss to biodiversity? A UK perspective. *Planning Practice and Research* 22(2): 155–175.

Lawton J, Brown V, Elphick C, et al. (2010) *Making Space for Nature: a review of England's Wildlife Sites and Ecological Network*. London: DEFRA.

MacKenzie D (2007) Is economics performative? Option theory and the construction of derivatives markets. In: MacKenzie D, Muniesa F, and Siu L (eds), *Do Economists Make Markets? On the Performativity of Economics*, Oxford: Princeton University Press, pp. 54–86.

MacKenzie D (2009) *Material Markets: How Economic Agents Are Constructed*. Oxford: Oxford University Press.

Madsen B (2013) Digging in: 2013 Research on 'Level Playing Field' of 2008 Wetland Mitigation Rules. *Madsen Environmental*. Available from: http://madsenenvironmental.com/2013/01/25/digging-in-2013-research-on-level-playing-field-of-2008-wetland-mitigation-rules/ (accessed 1 September 2015).

Madsen B, Carroll N and Moore Brands K (2010) *State of Biodiversity Markets Report: Offset and Compensation Programs Worldwide*. Washington, D.C.: Forest Trends.

Madsen B, Carroll N, Kandy D, et al. (2011) *2011 Update: State of Biodiversity Markets Report: Offset and Compensation Programs Worldwide*. Washington, D.C.: Forest Trends.

Mead D (2008) History and theory: the origin and evolution of conservation banking. In: Carroll N, Fox J, and Bayon R (eds), *Conservation & Biodiversity Banking, A Guide to Setting Up and Running Biodiversity Credit Trading Systems*, London: Earthscan, pp. 9–31.

Miller D (2002) Turning Callon the right way up. *Economy and Society* 31(2): 218–233.

Mitchell T (2008) Rethinking economy. *Geoforum* 39(3): 1116–1121.

Muniesa F and Callon M (2007) Economic experiments and the construction of markets. In: MacKenzie D, Muniesa F, and Siu L (eds), *Do Economists Make Markets? On the Performativity of Economics*, Princeton: Princeton University Press, pp. 163–189.

Muniesa F, Millo Y and Callon M (2007) An introduction to market devices. In: Callon M, Millo Y, and Muniesa F (eds), *Market Devices*, Malden, MA: Blackwell Publishing, pp. 1–12.

Paterson O (2013) Biodiversity Offsetting/Ecosystems Markets Task Force: 5 Sep 2013: Hansard Written Answers and Statements - TheyWorkForYou. *They Work For You*. Available from: http://www.theyworkforyou.com/wms/?id=2013-09-05a.27WS.4 (accessed 10 September 2013).

Preda A (2006) Socio-Technical Agency in Financial Markets: The Case of the Stock Ticker. *Social Studies of Science* 36(5): 753–782.

Quétier F (2012) The metrics debate: habitat for middle-aged great blue herons who don't like shrimp? *The ecosystem services blog*. Available from: http://blog.ecosystem-services.org/2012/04/22/the-metrics-debate-habitat-for-middle-aged-great-blue-herons-who-dont-like-shrimp/.

Robertson M (2004) The neoliberalization of ecosystem services: wetland mitigation banking and problems in environmental governance. *Geoforum* 35(3): 361–373.

Robertson M (2006) The nature that capital can see: science, state, and market in the commodification of ecosystem services. *Environment and Planning D: Society and Space* 24(3): 367–387.

Robertson M (2007) Discovering price in all the wrong places: the work of commodity definition and price under neoliberal environmental policy. *Antipode* 39(3): 500–526.

Rosenbaum EF (2000) What is a market? On the methodology of a contested concept. *Review of Social Economy* 58(4): 455–482.

Stern N (2007) *The Economics of Climate Change : the Stern review*. Cambridge; New York: Cambridge University Press.

Svetlova E (2012) On the performative power of financial models. *Economy and Society* 41(3): 418–434.

TEEB (2008) *The Economics of Ecosystems and Biodiversity. An Interim Report*. Wesseling: European Communities. Available from: http://www.teebweb.org/media/2008/05/TEEB-Interim-Report_English.pdf (accessed 10 December 2015).

ten Kate K, Bishop J and Bayon R (2004) *Biodiversity offsets: views, experience, and the business case*. London: Insight Investment.

Treweek J, ten Kate K, Butcher B, et al. (2009) *Scoping Study for the Design and Use of Biodiversity Offsets in an English Context*. London: DEFRA.

USFWS (2003) Guidance for the Establishment, Use, and Operation of Conservation Banks. Memorandum. Available from: http://www.fws.gov/endangered/esa-library/pdf/Conservation_Banking_Guidance.pdf.